

$K_1(1270)$

$$I(J^P) = \frac{1}{2}(1^+)$$

NODE=M028

 $K_1(1270)$ MASS

NODE=M028205

VALUE (MeV) DOCUMENT ID**1272±7 OUR AVERAGE** Includes data from the 2 datablocks that follow this one.

NODE=M028MX

PRODUCED BY K^- , BACKWARD SCATTERING, HYPERON EXCHANGE

NODE=M028M2

VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT

NODE=M028M2

The data in this block is included in the average printed for a previous datablock.

1275±10 700 GAVILLET 78 HBC + 4.2 $K^- p \rightarrow \Xi^- (K \pi \pi)^+$ **PRODUCED BY K BEAMS**

NODE=M028M3

VALUE (MeV) DOCUMENT ID TECN CHG COMMENT

NODE=M028M3

The data in this block is included in the average printed for a previous datablock.

1270±10 ¹ DAUM 81C CNTR - 63 $K^- p \rightarrow K^- 2\pi p$

• • • We do not use the following data for averages, fits, limits, etc. • • •

~ 1276 ² TORNQVIST 82B RVUE~ 1300 VERGEEST 79 HBC - 4.2 $K^- p \rightarrow (\bar{K} \pi \pi)^- p$ 1289±25 ³ CARNEGIE 77 ASPK ± 13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$ ~ 1300 BRANDENB... 76 ASPK ± 13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$ ~ 1270 OTTER 76 HBC - 10,14,16 $K^- p \rightarrow (\bar{K} \pi \pi)^- p$ 1260 DAVIS 72 HBC + 12 $K^+ p$ 1234±12 FIRESTONE 72B DBC + 12 $K^+ d$ ¹ Well described in the chiral unitary approach of GENG 07 with two poles at 1195 and 1284 MeV and widths of 246 and 146 MeV, respectively.² From a unitarized quark-model calculation.³ From a model-dependent fit with Gaussian background to BRANDENBURG 76 data.

NODE=M028M3;LINKAGE=DA

NODE=M028M3;LINKAGE=T

NODE=M028M3;LINKAGE=E

PRODUCED BY BEAMS OTHER THAN K MESONS

NODE=M028M1

VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT

NODE=M028M1

1248.1± 3.3±1.4 GULER 11 BELL $B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

• • • We do not use the following data for averages, fits, limits, etc. • • •

1279 ±10 25k ⁴ ABLIKIM 06C BES2 $J/\psi \rightarrow \bar{K}^*(892)^0 K^+ \pi^-$ 1294 ±10 310 RODEBACK 81 HBC 4 $\pi^- p \rightarrow \Lambda K 2\pi$ 1300 40 CRENNELL 72 HBC 0 4.5 $\pi^- p \rightarrow \Lambda K 2\pi$ 1242 $\begin{smallmatrix} +9 \\ -10 \end{smallmatrix}$ ⁵ ASTIER 69 HBC 0 $\bar{p} p$ 1300 45 CRENNELL 67 HBC 0 6 $\pi^- p \rightarrow \Lambda K 2\pi$ ⁴ Systematic errors not estimated.⁵ This was called the C meson.

NODE=M028M1;LINKAGE=AB

NODE=M028M1;LINKAGE=A

PRODUCED IN τ LEPTON DECAYS

NODE=M028MT

VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT

NODE=M028MT

1254±33±34 7k ASNER 00B CLEO ± $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ **$K_1(1270)$ WIDTH**

NODE=M028210

VALUE (MeV) DOCUMENT ID

NODE=M028WX

90±20 OUR ESTIMATE This is only an educated guess; the error given is larger than the error on the average of the published values.

→ UNCHECKED ←

87± 7 OUR AVERAGE Includes data from the 2 datablocks that follow this one.**PRODUCED BY K^- , BACKWARD SCATTERING, HYPERON EXCHANGE**

NODE=M028W2

VALUE (MeV) EVTS DOCUMENT ID TECN CHG COMMENT

NODE=M028W2

The data in this block is included in the average printed for a previous datablock.

75±15 700 GAVILLET 78 HBC + 4.2 $K^- p \rightarrow \Xi^- K \pi \pi$

PRODUCED BY K BEAMS

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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The data in this block is included in the average printed for a previous datablock.

90 ± 8	⁶ DAUM	81C	CNTR	-	63 $K^- p \rightarrow K^- 2\pi p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
~ 150	VERGEEST	79	HBC	-	4.2 $K^- p \rightarrow (\bar{K} \pi \pi)^- p$
150 ± 71	⁷ CARNEGIE	77	ASPK	±	13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$
~ 200	BRANDENB...	76	ASPK	±	13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$
120	DAVIS	72	HBC	+	12 $K^+ p$
188 ± 21	FIRESTONE	72B	DBC	+	12 $K^+ d$

⁶Well described in the chiral unitary approach of GENG 07 with two poles at 1195 and 1284 MeV and widths of 246 and 146 MeV, respectively.

⁷From a model-dependent fit with Gaussian background to BRANDENBURG 76 data.

NODE=M028W3
NODE=M028W3

NODE=M028W3;LINKAGE=DA

NODE=M028W3;LINKAGE=E

PRODUCED BY BEAMS OTHER THAN K MESONS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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119.5 ± 5.2 ± 6.7		GULER	11	BELL	$B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
131 ± 21	25k	⁸ ABLIKIM	06C	BES2	$J/\psi \rightarrow \bar{K}^*(892)^0 K^+ \pi^-$
66 ± 15	310	RODEBACK	81	HBC	$4 \pi^- p \rightarrow \Lambda K 2\pi$
60	40	CRENNELL	72	HBC	0 $4.5 \pi^- p \rightarrow \Lambda K 2\pi$
127 ⁺⁷ / ₋₂₅		ASTIER	69	HBC	0 $\bar{p} p$
60	45	CRENNELL	67	HBC	0 $6 \pi^- p \rightarrow \Lambda K 2\pi$

⁸Systematic errors not estimated.

NODE=M028W1
NODE=M028W1

NODE=M028W1;LINKAGE=AB

PRODUCED IN τ LEPTON DECAYS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
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260 ⁺⁹⁰/₋₇₀ ± 80	7k	ASNER	00B	CLEO	± $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$
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NODE=M028WT
NODE=M028WT

 $K_1(1270)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $K \rho$	(42 ± 6) %
Γ_2 $K_0^*(1430) \pi$	(28 ± 4) %
Γ_3 $K^*(892) \pi$	(16 ± 5) %
Γ_4 $K \omega$	(11.0 ± 2.0) %
Γ_5 $K f_0(1370)$	(3.0 ± 2.0) %
Γ_6 γK^0	seen

NODE=M028215;NODE=M028

DESIG=2

DESIG=7

DESIG=1

DESIG=5

DESIG=8

DESIG=9;OUR EST;→ UNCHECKED ←

 $K_1(1270)$ PARTIAL WIDTHS **$\Gamma(K \rho)$**

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
57 ± 5	MAZZUCATO	79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K \pi \pi)^+$
75 ± 6	CARNEGIE	77B	ASPK	±	13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$

Γ_1

NODE=M028W5
NODE=M028W5

 $\Gamma(K_0^*(1430) \pi)$

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
26 ± 6	CARNEGIE	77B	ASPK	±	13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$

Γ_2

NODE=M028W7
NODE=M028W7

 $\Gamma(K^*(892) \pi)$

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
14 ± 11	MAZZUCATO	79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K \pi \pi)^+$
2 ± 2	CARNEGIE	77B	ASPK	±	13 $K^\pm p \rightarrow (K \pi \pi)^\pm p$

Γ_3

NODE=M028W4
NODE=M028W4

$\Gamma(K\omega)$ Γ_4

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4 ± 4	MAZZUCATO 79	HBC	+	4.2 $K^- p \rightarrow \Xi^- (K\pi\pi)^+$
24 ± 3	CARNEGIE 77B	ASPK	±	13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$

NODE=M028W6
 NODE=M028W6

 $\Gamma(K f_0(1370))$ Γ_5

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
22 ± 5	CARNEGIE 77B	ASPK	±	13 $K^\pm p \rightarrow (K\pi\pi)^\pm p$

NODE=M028W8
 NODE=M028W8

 $\Gamma(\gamma K^0)$ Γ_6

VALUE (keV)	DOCUMENT ID	TECN	COMMENT
73.2 ± 6.1 ± 28.3	ALAVI-HARATI02B	KTEV	$K + A \rightarrow K^* + A$

NODE=M028W9
 NODE=M028W9

 $K_1(1270)$ BRANCHING RATIOS

NODE=M028225

 $\Gamma(K\rho)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.42 ± 0.06	⁹ DAUM	81C CNTR	63 $K^- p \rightarrow K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.584 ± 0.043	¹⁰ GULER	11 BELL	$B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$
dominant	RODEBACK	81 HBC	4 $\pi^- p \rightarrow \Lambda K 2\pi$

NODE=M028R2
 NODE=M028R2

 $\Gamma(K_0^*(1430)\pi)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.28 ± 0.04	⁹ DAUM	81C CNTR	63 $K^- p \rightarrow K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.0201 ± 0.0064	¹⁰ GULER	11 BELL	$B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

NODE=M028R4
 NODE=M028R4

 $\Gamma(K^*(892)\pi)/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.16 ± 0.05	⁹ DAUM	81C CNTR	63 $K^- p \rightarrow K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.171 ± 0.023	¹⁰ GULER	11 BELL	$B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

NODE=M028R1
 NODE=M028R1

 $\Gamma(K\omega)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.11 ± 0.02	⁹ DAUM	81C CNTR	63 $K^- p \rightarrow K^- 2\pi p$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.225 ± 0.052	¹⁰ GULER	11 BELL	$B^+ \rightarrow J/\psi K^+ \pi^+ \pi^-$

NODE=M028R3
 NODE=M028R3

 $\Gamma(K\omega)/\Gamma(K\rho)$ Γ_4/Γ_1

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 0.30	95	RODEBACK	81 HBC	4 $\pi^- p \rightarrow \Lambda K 2\pi$

NODE=M028R6
 NODE=M028R6

 $\Gamma(K f_0(1370))/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
0.03 ± 0.02	⁹ DAUM	81C CNTR	63 $K^- p \rightarrow K^- 2\pi p$

NODE=M028R5
 NODE=M028R5

 $D\text{-wave}/S\text{-wave RATIO FOR } K_1(1270) \rightarrow K^*(892)\pi$

VALUE	DOCUMENT ID	TECN	COMMENT
1.0 ± 0.7	⁹ DAUM	81C CNTR	63 $K^- p \rightarrow K^- 2\pi p$

NODE=M028R9
 NODE=M028R9

⁹ Average from low and high t data.

¹⁰ Assuming that decays are saturated by the $K\rho$, $K_0^*(1430)\pi$, $K^*(892)\pi$, $K\omega$ decay modes and neglecting interference between them. The values $B(\omega \rightarrow \pi^+\pi^-) = (1.53^{+0.11}_{-0.13})\%$ and $B(K_0^*(1430) \rightarrow K\pi) = (93 \pm 10)\%$ are used. Systematic uncertainties not estimated.

NODE=M028R;LINKAGE=F
 NODE=M028R1;LINKAGE=GU

K₁(1270) REFERENCES

NODE=M028

GULER	11	PR D83 032005	H. Guler <i>et al.</i>	(BELLE Collab.)	REFID=53668
GENG	07	PR D75 014017	L.S. Geng <i>et al.</i>		REFID=51623
ABLIKIM	06C	PL B633 681	M. Ablikim <i>et al.</i>	(BES Collab.)	REFID=51037
ALAVI-HARATI	02B	PRL 89 072001	A. Alavi-Harati <i>et al.</i>	(FNAL KTeV Collab.)	REFID=48822
ASNER	00B	PR D62 072006	D.M. Asner <i>et al.</i>	(CLEO Collab.)	REFID=47766
TORNQVIST	82B	NP B203 268	N.A. Tornqvist	(HELS)	REFID=20573
DAUM	81C	NP B187 1	C. Daum <i>et al.</i>	(AMST, CERN, CRAC, MPIM+)	REFID=22548
RODEBACK	81	ZPHY C9 9	S. Rodeback <i>et al.</i>	(CERN, CDEF, MADR+)	REFID=22550
MAZZUCATO	79	NP B156 532	M. Mazzucato <i>et al.</i>	(CERN, ZEEM, NIJM+)	REFID=20867
VERGEEST	79	NP B158 265	J.S.M. Vergeest <i>et al.</i>	(NIJM, AMST, CERN+)	REFID=22542
GAVILLET	78	PL 76B 517	P. Gavillet <i>et al.</i>	(AMST, CERN, NIJM+) JP	REFID=22538
CARNEGIE	77	NP B127 509	R.K. Carnegie <i>et al.</i>	(SLAC)	REFID=22535
CARNEGIE	77B	PL 68B 287	R.K. Carnegie <i>et al.</i>	(SLAC)	REFID=22536
BRANDENB...	76	PRL 36 703	G.W. Brandenburg <i>et al.</i>	(SLAC) JP	REFID=22532
OTTER	76	NP B106 77	G. Otter <i>et al.</i>	(AACH3, BERL, CERN, LOIC+) JP	REFID=22533
CRENNELL	72	PR D6 1220	D.J. Crennell <i>et al.</i>	(BNL)	REFID=22419
DAVIS	72	PR D5 2688	P.J. Davis <i>et al.</i>	(LBL)	REFID=22505
FIRESTONE	72B	PR D5 505	A. Firestone <i>et al.</i>	(LBL)	REFID=22506
ASTIER	69	NP B10 65	A. Astier <i>et al.</i>	(CDEF, CERN, IPNP, LIVP) IJP	REFID=22482
CRENNELL	67	PRL 19 44	D.J. Crennell <i>et al.</i>	(BNL) I	REFID=22473
